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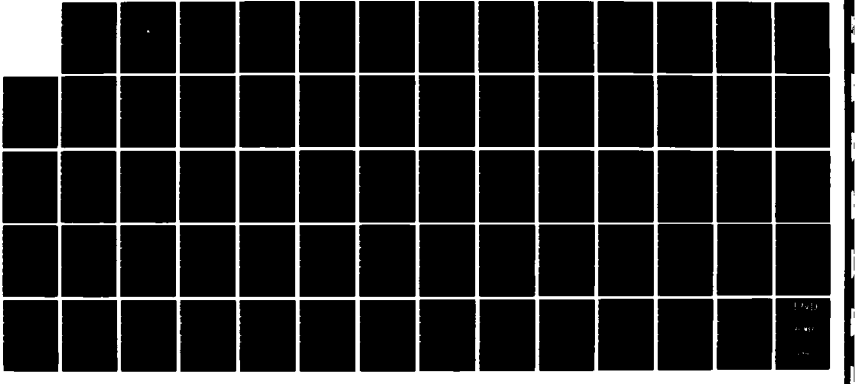

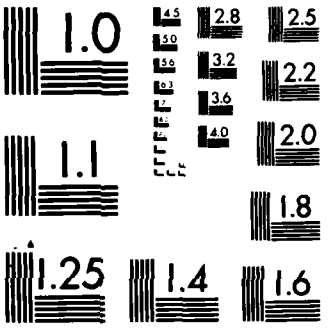

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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

COST ACCUMULATION
WITHIN THE
PUGET SOUND NAVAL SHIPYARD

by

Terry Arthur Bragg

June 1985

Thesis Co-advisors: K. Euske
S. Ansari

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The purpose of this research project is to examine the cost accounting and reporting structure used by Naval shipyards. The investigation focuses on developing an understanding of the degree to which the data collected by this system fulfills the requirements of the Department of Defense (DoD) uniform cost accounting system as set forth in the Depot Maintenance and Maintenance Support Cost

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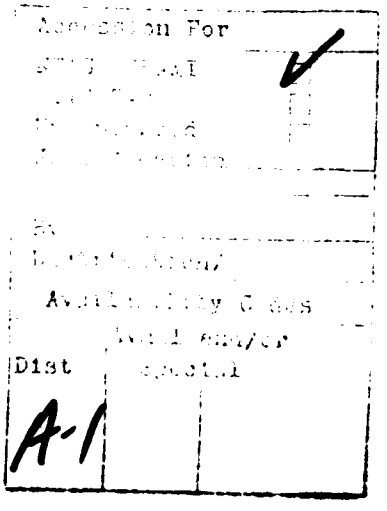

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Cost Accumulation Within The Puget Sound Naval Shipyard

by

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Lieutenant, United States Navy
B.A., Appalachian State University, 1978

Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The purpose of this research project is to examine the cost accounting and reporting structure used by Naval shipyards. The investigation focuses on developing an understanding of the degree to which the data collected by this system fulfills the requirements of the Department of Defense (DoD) uniform cost accounting system as set forth in the Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook (DoD instruction 7220.29-H).

To satisfy this requirement, this thesis provides the reader with the information necessary to understand the depot maintenance reporting system, introduces the historical significance and importance of a uniform cost accounting system, and provides insight into the performance of depot maintenance in the system of Naval Shipyards. Investigation focuses on the cost accumulation system used by Puget Sound Naval Shipyard to determine how this system satisfies DoD requirements.

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I. INTRODUCTION

A. THESIS OBJECTIVE

The purpose of this research project is to examine the cost accounting and reporting structure used by Naval shipyards. The investigation focuses on developing an understanding of the degree to which the data collected by this system fulfills the requirements of the Department of Defense (DoD) uniform cost accounting system as set forth in the "Cost Accounting and Production Reporting Handbook" (DoD Instruction 7220.29-H).

The reporting requirements of the Naval shipyard to its parent command, Naval Sea Systems Command (NAVSEA) was also studied to determine what information presently reported to the NAVSEA organization supports the information requirements of the Department of Defense (DoD). Additionally, the internal cost accounting and reporting system used by the Puget Sound Naval Shipyard was analyzed as an example of a third reporting structure that supports DoD, NAVSEA, and internal information objective.

B. HISTORY OF THE PROBLEM

From a historical perspective, the Department of Defense (DoD) has attempted since 1963 to establish a functioning cost accounting and reporting system which would apply to all service depot level maintenance activities. Up to this time, accounting practices and procedures used by the various services and among depot maintenance activities within each service yielded information of questionable comparability. Problems included the use of job and process costing methods, accounting for product and functional costs

when such costs were financed through differing appropriation accounts and the lack of comparability in the treatment of costs between installations. Because the aggregated costs for repair, overhaul and maintenance were accumulated and reported by such varied means, no specific analysis or overview was possible. Difficulties became even more pronounced when an attempt was made to determine the maintenance costs of particular weapons systems. When specific cost data was required, a special study group would be used to aggregate cost data because there was no consistent system which would routinely collect the total cost of the maintenance function identified to a specific weapon system. Even these studies yielded inconclusive information because there was no auditable system covering all aspects of the maintenance function from which to extract data. (Jivatode, July 1977)

In 1972, the Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (presently Manpower, Installations and Logistics) chartered the Joint Logistics Commanders (JIC) panel to create a depot maintenance cost accounting manual to be used by all maintenance depots within all services. The goal for this manual was to provide definitive instructions on the implementation of a common and manageable accounting system. This system would be used to provide information on cost and production data with necessary comparability and validity characteristics. (Jivatode, July 1977)

Following the survey of costing practices used by representative depot level maintenance activities, JLC promulgated under the auspices of OASD in October 1975, DoD Instruction 7220.29 "Guidance for Cost Accounting and Reporting for Deport Maintenace and Maintenace Support" and DoD Instruction 7220.29-H "Depot Maintenace and Maintenance Support Cost Accounting and Production Reporting Handbook."

The target date for implementation by all services of this new system was October 1, 1976. (General Accounting Office, May 1978)

The objectives of the new system were stated as follows:

> To establish a uniform cost accounting system for use in accumulating the costs of depot maintenance activities as they relate to the weapon systems supported or items maintained. This information would enable managers to compare unit repair costs with replacement costs.
>
> To assure uniform recording, accumulating and reporting of depot maintenance operations and maintenance support activities so that comparison of repair costs can be made between depots and between depots and contract sources performing similiar maintenance functions.
>
> To assist in measuring productivity, developing perfcrmance and cost standards and determining areas for management emphasis, which would enable managers to evaluate depot maintenance and maintenance support activities for efficient resouce use.
>
> To provide a means of identifying maintenance capability and duplication of capacity and indicating both actual and potential areas for interservice support of maintenance workload. (General Accounting Office, May 1979)

Although considerable effort has been expended to develop and implement a standardized cost accounting system, a fully functioning system does not presently exist. Numerous discrepancies are still being encountered. Costs continue to be identified and accounted for on differing bases among and between depots of the various services (Tackett, June 1984; Burnett, June 1984). Instances of non-compliance with established DoD guidance because of long standing differences between the services and DoD method have resulted in data error as reported to the Office of the Assistant Secretary of Defense (OASD). (Defense Audit Service, April 1981)

Current efforts to implement a uniform cost accounting system include the establishemnt of the Joint Depot Maintenance Analysis Group (JDMAG) by JLC and an ongoing series of Depot Maintenance Workshops directly under the

auspices of the Office of Assistant Secretary of Defense for Manpower, Installaticns and Logistics (OASD (MI&L)) and the Office of the Assistart Secretary of Defense for Maragement Systems (OASD (C)MS). The JDMAG and workshop concept were both developed to pursue the elimination or explanaticn of costing inconsistencies between the various services and to monitcr the implementation of the basic guidance, DoD Instruction 7220.29-H. This cngoing program of review and action has resulted in changes to promulgated guidance and an increased awareness that the reporting system can be made more complete and accurate. (Defense Audit Service, April 1981 and Office of the Assistant Secretary of Defense, September 1984)

II. THE DEPOT MAINTENANCE SYSTEM

A. SCOPE OF DEPOT MAINTENANCE

The purpose of this chapter is to explain the depot level maintenance system used within DoD, the shipyard administrative organizational hierarchy and how these concepts apply specifically to Puget Sound Naval Shipyard.

Within the Department of Defense (DoD) maintenance is accomplished at three levels of increasing complexity. The most basic level is operational maintenance. Operational maintenance is performed by the asset user and is preventive in nature and includes minor repairs. The next higher level of maintenance is intermediate maintenance. Intermediate maintenance is based on a capability for component and assembly repair, replacement or calibration. The most advanced level of maintenance is depot maintenance. This maintenance is characterized by major system replacement, repair or reconditioning. Except for emergent casualties, depot maintenance is scheduled to be accomplished at multi-year intervals depending on the specific weapon system and the depot level maintenance facility involved.

Depot maintenance within DoD is defined as:

> "maintenance which is the responsibility of and performed by designated maintenance activities, to augment stocks of serviceable material and to support organizational maintenance and intermediate maintenance activities by the use of more extensive shop facilities, equipment, and personnel of higher technical skill than are available at the lower levels of maintenance. The phases normally consist of inspection, test, repair, modification, alteration, modernization, conversion overhaul, reclamation or rebuild of parts, assemblies, subassemblies, components, equipment end items, and weapon systems; the manufacture of critical nonavailable parts; and providing technical assistance to; intermediate maintenance organizations, using and other activities. Depot maintenance is normally accomplished

in fixed shops, shipyards, and other shore based facilities, or by depot field teams". (DoD Directive 4151.16, August 1972)

Depot maintenance facilities may be classified as four different types; government owned and operated (GOGO), government owned and contractor operated (GOCO), owned and operated by a contractor (COCO), or jointly owned by Government and contractor (JOCO). All eight Naval shipyards would be classified as GOGO, government owned and operated by active duty military and civil service employees. (DoDINST 7220.29-H, October 1975)

Overall organizational guidance for Naval shipyards is contained in NAVSHIPSINST 5450.14, STANDARD NAVAL SHIPYARD ORGANIZATION MANUAL. This manual prescribes standards for organizational structure and assignment of functional responsibilities. The official mission assigned to all Naval shipyards is:

To provide logistic support for assigned ships and service craft; to perform authorized work in connection with construction, conversion, overhaul, repair, alteration, drydocking and outfitting of ships and crafts, as assigned; to perform manufacturing, research development and test work, as assigned; and to provide services and material to other activities and units as directed by competent authority. (SECNAVNOTE 5450, April 1956)

More specific guidance for depot level maintenance performed at Naval shipyards include:

Providing logistic support to activities and units of the Operational Forces of the U.S. Navy and Naval shore (field) activites as assigned by competent authority.

Performing authorized shipwork in connection with new construction, conversion, overhaul, repair, alteration, activation, inactivation and outfitting of Naval ships and service craft.

Performing authorized repairables, work in connection with repair, restoration, refit, refurbishment and overhaul of systems, equipment, components, and modules as scheduled.

Designing Naval ships.

Operating as a planning yard for ship alterations.

Preparing allowance lists for ships under construction and conversion. (NAVSHIPBREMINST 5450.8E, June 1972)

B. MANAGEMENT OF DEPOT MAINTENANCE

The Chief of Naval Material (CNM) is responsible to the Chief of Naval Operations (CNO) for overall management of the Navy Depot maintenance program. Within the specific area of shipyard depot maintenance, overall maintenance responsibility has been further delegated from CNM to Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) who functions as Activity Group Commander for all Naval shipyards. As Activity Group Commander, COMNAVSEACOM is responsible for budget review and mission execution through the used of all eight Naval shipyards. Figure 2.1, Depot Maintenance Command Hierarchy provides a line diagram that shows the chain of responsibility from the Office of the Secretary of Defense down to the individual shipyard level.

Note: The disestablishment of the Chief of Naval Material's organization was announced by the Secretary of the Navy in January 1985. As of May 1985, the shift of duties and responsibilities formerly held by CNM remains in a state of flux.

Financially, the Naval shipyards are elements of the Navy Industrial Fund (NIF). As such, the shipyards are procedurally responsible to the Comptroller of the Navy (NAVCOMPT) through COMNAVSEASYSCOM for financial matters. NAVCOMPT functions as the CNO's designated agent for NIF accounting policy and procedures as promulgated through volumes 3 and 5 of the NAVCOMPT Manual. The Activity Group

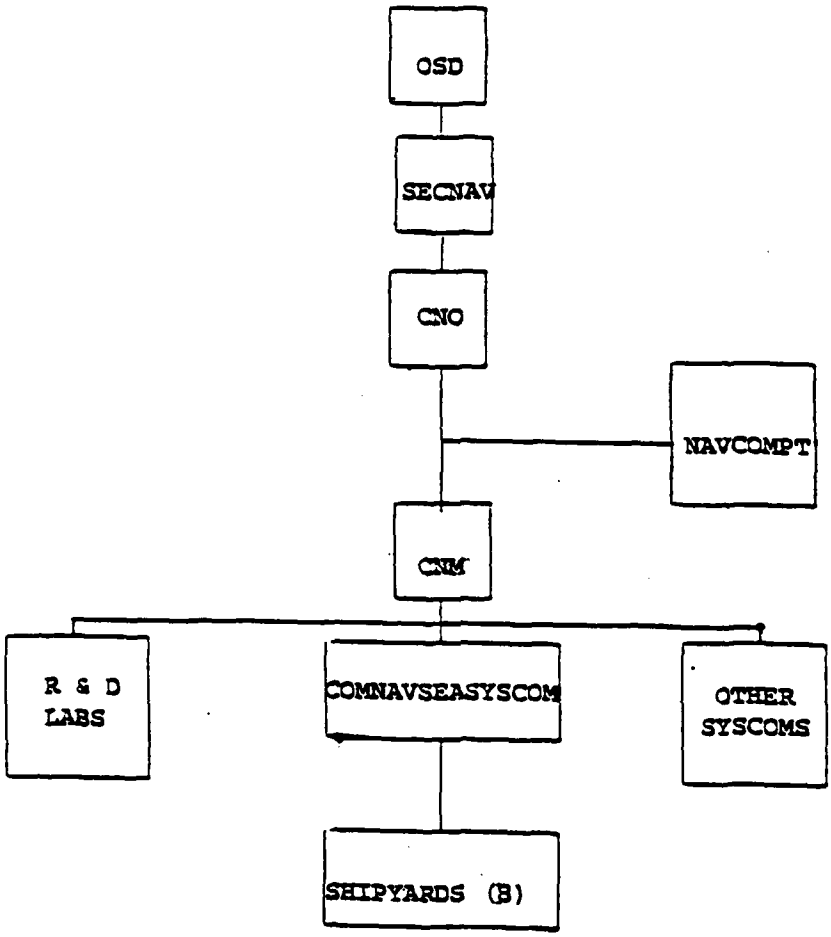

Figure 2.1: Depot Maintenance
Command Hierarchy

Source: Adapted from PRACTICAL
CONTROLLERSHIP, July 1983

Commander, COMNAVSEASYSCOM has promulgated supplemental financial guidance to that promulgated by NAVCOMPT appropriate to specific shipyard operation through NAVSEAINST 7600.27, NAVSEA NAVY INDUSTRIAL FUND FINANCIAL MANAGEMENT SYSTEMS AND PROCEDURES MANUAL (NIF Manual). The NIF Manual is a consolidation of all NAVSEA instructions applicable to accounting and budgeting at Naval shipyards. It is the basic medium for dissemination of policies, regulations and procedures concerning financial management under the technical control of the Comptroller, Naval Sea Systems Command. The NIF manual emphasizes the importance of the Comptroller and his organization at any specific NIF activity as the resident experts on budgeting, accounting, fiscal progress, statistical reporting, internal control and attempts to direct this operation.

C. PUGET SOUND NAVAL SHIPYARD

1. Activity Background and Organization

Puget Sound Naval Shipyard is one of eight government owned and operated industrial activites forming the core of naval ship maintenance capability. The facility is housed in some 270 buildings covering 688 acres of land (348 hard land, 340 submerged land) in Kitsap County, Washington state. The shipyard maintains 6 drydocks (one of which is the largest in the world), 7 piers and 17 major industrial shops. PSNS is staffed and operated by approximately 260 military personnel and 12,500 government civilian employees, including a direct labor force (production) of approximately 8100 workers. (Command Presentation, October 1984)

The facility began operation in 1891 as the Puget Sound Naval Station. Groundbreaking for the first drydock was completed in 1896 and the first battleship was drydocked in early 1897. Subsequent program developments include:

the establishment of a test apprenticeship program in 1901, servicing of World Wars I AND II, the Korean War, establishment of a submarine overhaul capability in 1962 and designation as a nuclear repair facility in 1965. (Command Presentation, October 1984)

The Shipyard is under the command of an officer designated "Commander", with the line of authority and control passing from the shipyard Commander through the heads of departments to the head of subordinate units. As such, the shipyard Commander retains personal control over all shipyard organizational functions down to the level of Department head where responsibility for specific organizational structure and performance for each department has been formally delegated. This first echelon on management comprised of the heads of Departments contains a mix of both military and government civilian managerial personnel (Civil Service). They have direct responsibility for all budget estimates and expenditures necessary to support operations of the shipyard budgetary plan. (NAVSHIPYDBREMINST 5450.8E, June 1972)

The secondary level of supervision under the Department Head includes division, branch, section, unit or group and shop managers. These individuals are held accountable for coordination and control over the functions under their cognizance and to provide expert assistance and advice to the Department heads or Commander as necessary. Although authority has not been formally delegated to this secondary level of supervision as in the case of the Department heads, the purpose of these billets is to provide a decentralizing effect on the organization by placing more decision making authority at the lower levels of command. The Commander of the Shipyard is also supported by a number of special assistants functioning in a staff capacity to include legal Counsel, Occupational Safety and Health, Public Affairs,

Radiolcgical Contrcl, Quality Assurance, Industrial Relations, Management Engineering and others. (NAVSHIPYDBREMINST 5450.8E, June 1972)

As depicted in Figure 2.2, PSNS Organizatien Structure there are 8 functional departments within the shipyard. The Planning, Production, and Nuclear Engineering departments are the largest functional organizations within the shipyard. The remaining departments, Public works, Supply, Comptroller, Naval Hospital, and Administration are all service activites servicing not only Puget Scund Naval Shipyard but naval activites in the geographic area to include Naval Base, Bremertcn and Naval Base, Seattle. (NAVSHIPYDBREMINST 5450.8E, June 1972)

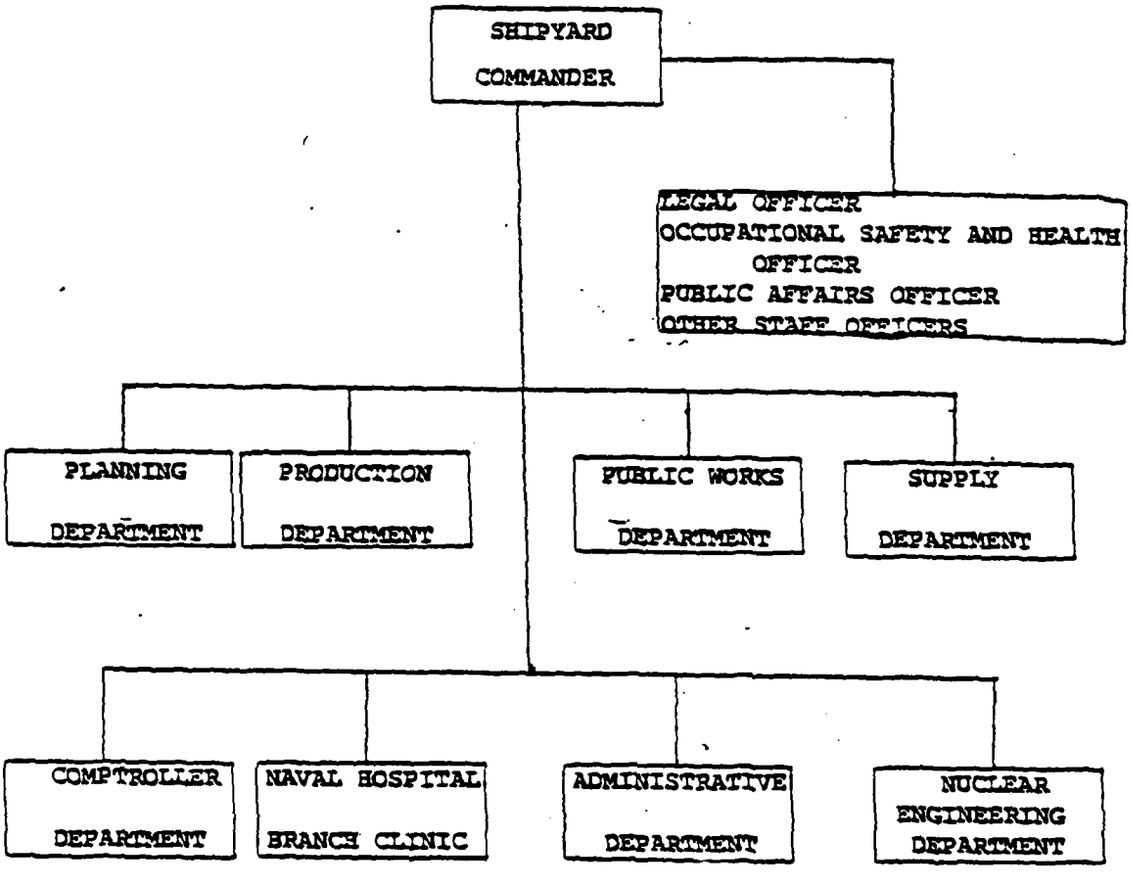

Figure 2.2: PSNS Organizational Chart

Source: Adapted from NAVSHIPYDBREMINST 5450.8E, June 1972

III. PRODUCTION FLOW AND COST ACCUMULATION WITHIN PSNS

A. PRODUCTION

The production process used by the Puget Sound Naval Shipyard starts with the evaluation of a proposed maintenance contract, which is called a reimbursable order, by appropriate shipyard managers. The evaluation process for reimbursable orders is performed to determine whether the shipyard maintains the technical capability, manpower, and facilities necessary to perform the maintenance outlined in the reimbursable order. Upon acceptance, the authorized amount of the reimbursable order becomes a statutory obligation of the customer's funds or appropriation in the case of government contracts. (NIF Manual, October 1981)

There are three types of reimbursable orders used by the Puget Sound Naval Shipyard: cost reimbursable, predetermined rate and fixed price. The cost reimbursable order involves accumulating direct and indirect costs in such a manner as to allow charging these specific costs to the customer. The predetermined rate method involves charging customers a preset hourly, daily or monthly rate for service rendered. The fixed price reimbursable order involves an agreement between the shipyard and its customer for specific work at a specific fixed price. The types of reimbursable orders are discussed in greater detail later in this chapter. (PRACTICAL CONTROLLERSHIP, July 1983)

To support the reimbursable order one or more Customer Order Records (COAR's) are established by the shipyard Comptroller. A COAR is an internal document issued to serve as authority for the performance of work. No customer work is initiated nor costs incurred prior to the issuance of a

COAR. A COAR is established for each separate item or major segment of work contained in the reimbursable order. The COAR states specific work to be accomplished with required date of delivery and the amount authorized in terms of costs or in direct labor hours and materials. (NIF MANUAL, October 1981)

Upon establishment of the COAR, the Planning Department performs the next step in the production process. The Planning Department has overall responsibility for the administration of the preparation, approval, issue and transfer of work authorizations to the Production Department. As such, the Planning Departments performs all cost estimates and initiates necessary material procurement. To support this planning phase, job orders are issued to support discrete jobs outlined in the COAR. An additional document referred to as a Key Operation or Keyop is issued to support the various steps that might need to be accomplished in the performance of the jobs identified in the job order. For example, a COAR would be established to support the overhaul of a specific ship. A job order would be issued to support each specific maintenance action to be accomplished during the overhaul. A series of keyops would be issued to support the various stages or steps of the job order. Figure 3.1, Production Documentation is a flow chart outlining the various steps in the production process. (Clavering, March 1985)

Upon completion of the planning phase and the issuance of all production documentation via job orders and associated keyops, the Production Department performs the maintenance. The Production Department executes all work approved for accomplishment within the time allowed and in accordance with applicable instructions and sound engineering practice. Additionally, all maintenance must be accomplished within the total funds made available for each ship or project.

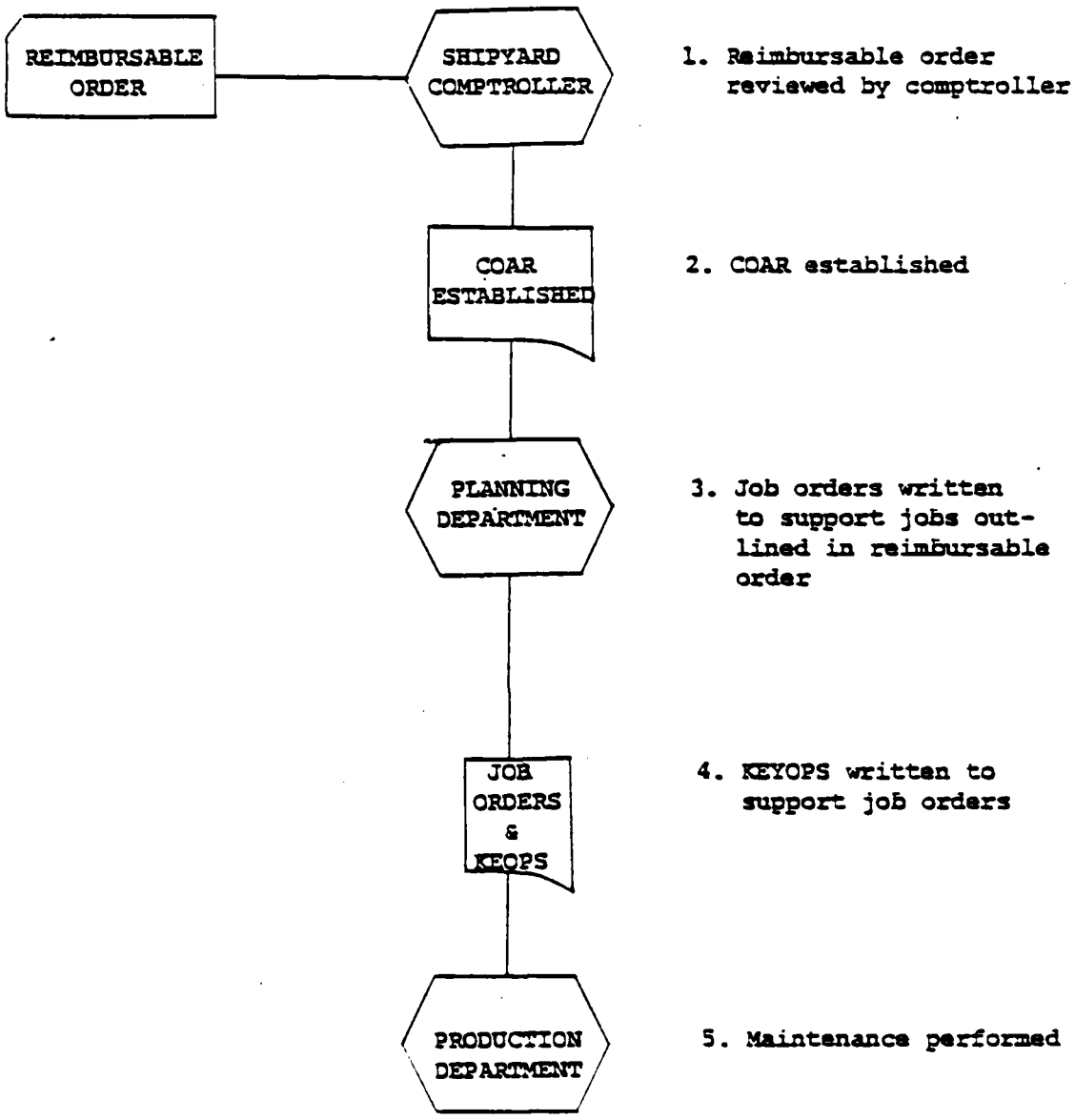

Figure 3.1

Production Documentation

The job order number is used as a reference to accumulate all production costs. (NAVSHIPYDBREMINST 5450.8E, June 1972)

B. COST ACCUMULATION

The purpose of the cost accounting system used by the Puget Sound Naval Shipyard is to collect all costs associated with the accomplishment of any specific maintenance action. A job order cost system is used to accumulate all labor, material and overhead costs.

1. Job Order System

Production manhours, labor costs, material costs and overhead costs associated with the performance of maintenance actions are collected in a job order system by job order number and shop number. Each working day a "Daily NIF Transaction Register" (Report symbol FA 104A) report produced by the Cost Accounting Division lists by COAR and job order number all work performed by each production shop by hours worked, labor applied, overhead applied and material. The maintenance costs for each respective production shop are further totaled to calculate total costs applied to each COAR and job order each working day. The Daily NIF Transaction Register is closed out on a weekly basis to a "Job Order Report-Weekly" (Report symbol FA 210A) and monthly to a "Job Order Report-Monthly" (Report Symbol FA 210D) for an accumulation of all costs incurred by COAR and associated job orders to date. As costs are reported they are entered into appropriate General Ledger Accounts to support the shipyard cost accounting system. (Clavering, March 1985)

2. Labor Distribution

The Puget Sound Naval Shipyard uses a labor distribution instrument (time card) to record the time worked by every employee at the facility. At the time of assigning work to an employee the supervisor enters the job order and keyop number for identification of the hours worked on the time card. As the worker finishes or changes tasks associated with particular job orders the supervisor annotates the time card. Overhead employees are charged to a job order number for overhead. This system allows the Payroll Branch to determine accrued payroll and the Cost Accounting Division to assign specific labor costs to the appropriate job order. The Cost Accounting division performs additional calculations to not only apply payroll costs but all applicable labor costs to a job order. At Navy Industrial Fund (NIF) activities, civilian salaries, wages and fringe benefits are applied to maintenance actions using a predetermined acceleration rate based on direct labor costs. The acceleration rate is designed to cover all costs incurred in providing those direct labor services not included in basic salaries and wages. For example, the following inputs are used as inputs in determining the acceleration rate:

Annual Leave
Sick Leave
Holiday and other leave
Federal Employee's Group Life Insurance
Federal Insurance Contributions
Retirement
Health Benefits

The acceleration rate is applied to labor costs to determine the total costs assigned to a specific job order. This information is reflected in the Daily NIF Transaction

Register and all accumulation reports subsequent. (NIF MANUAL, October 1981)

3. Material Cost Distribution

As stated earlier, the Planning Department issues the initial material requisitions to support all maintenance actions being processed. Subsequent material requisitions may be issued by either the Planning or Production Departments as necessary to support emergent needs. Charges for all direct materials used in the maintenance action are identified by job order and shop number. Requests are obtained through a variety of avenues to include the Navy supply system, commercial vendors or an inhouse supply of commonly used materials referred to as shop stores. The Material Liaison and Expediting Branch of the Supply Department is responsible to the Planning and Production Departments for responsive material support of ongoing maintenance actions. This branch processes the material requisitions, maintains an order status on all outstanding requisitions and expedites required material as necessary. It is the responsibility of the Receipt Control Branch of the Supply Department to record receipt and to make charges to the correct job order. Additionally, this branch processes and disposes of materials determined to be in excess of that required to complete a maintenance action and makes certain that appropriate job orders receive credit. All material costs are reflected in the Daily NIF Transaction Register and all subsequent accumulation reports. (NAVSHIPYDEREMINST 5450.8E, June 1972)

4. Overhead Application

Overhead rates are established for the purpose of obtaining reimbursement from the NIF customer for products or services which are not specifically identifiable to individual customers. Overhead rates are applied to maintenance actions in a manner that will prevent any significant over or under application. This is accomplished by applying overhead, both production and general and administrative to job orders based on production direct labor hours. A combined production/ general and administrative overhead rate for each production shop is applied and reflected in the Daily NIF Transaction Register based on the production direct labor hours worked. (Clavering, March 1985)

The indirect or overhead work structure was established to distinguish between overhead manhours and costs accumulated in production cost centers and those accumulated in general cost centers. A production overhead rate is developed for each production cost center which will spread the cost centers estimated net production expenses over all direct labor hours performed in the cost center. The term "production expense" includes indirect materials, indirect contractual services, indirect civilian labor, shop supervision , training , maintenance of equipment and tools, utilities, power and any other indirect expenses not identifiable or properly chargeable to a job order. The production overhead rate is calculated by dividing the estimated indirect expenses to be incurred by the total estimated direct labor hours to be worked in any specific production shop. The production overhead rate is calculated annually and reflected in the Annual Financial Management Budget (AFMB) submitted to COMNAVSEASYSCOM each year. Upon approval by COMNAVSEASYSCOM the production overhead rate becomes the standard for overhead allocation for all maintenance actions

performed by that production shop. The AFMB and budget process are discussed in greater detail in Chapter 4, Financial Information Flows. As stated above, the application of production overhead is reflected in the Daily NIF Transaction Register and all subsequent weekly and monthly accumulation reports. (NIF Manual, October 1981)

General and Administrative (G & A) overhead reflects effort which indirectly benefits the direct work of all production areas but cannot be specifically or economically identified to any one production cost center (Burnett, June 1984). Typical G & A expenses include shipyard administrative expenses, indirect material, indirect contractual services, indirect civilian labor, and any other costs incurred by designated cost centers that are not directly allocable to a specific job order. The G & A overhead expense rate is calculated by dividing the total estimated general and administrative expenses for the entire shipyard by the total estimated direct labor hours to be worked in all production cost centers during the period. Like the production overhead rate, the G & A overhead rate is calculated annually and reflected in the AFMB. Upon approval by COMNAVSEASYSCOM, the G & A overhead rate becomes the standard for G & A overhead allocation for all maintenance actions performed in all production shops in the shipyard. The G & A overhead rate is applied based on production direct labor hours worked and is reflected as applied in the Daily NIF Transaction Register. (NIF Manual, October 1981) Unlike the accumulation of production overhead, G & A overhead is split out of the overhead application rate reflected in the Daily NIF Transaction Register for subsequent weekly and monthly G & A overhead reporting. Weekly, G & A overhead is closed out to a "Job Order Report-Weekly/Demand-Expense Fiscal Year to Date" (Report Symbol FA 210C) and monthly to "Job Order Report- Monthly-Expense Fiscal Year to Date" (Report Symbol FA 210F). (Clavering, March 1985)

5. Cost Application

Because Puget Sound Naval Shipyard uses three different reimbursable order types there are differences in how direct labor, direct material, production overhead and G & A overhead are applied and billed.

The cost reimbursable order involves accumulating direct and indirect costs in such a manner as to allow charging these specific costs to a customer based on the actual costs incurred for labor, material and overhead. Since the advent of stabilized rates, this reimbursable order method is little used. (PRACTICAL COMPTROLLERSHIP, July 1983)

The Predetemined rate approach involves charging customers a preset hourly, daily or monthly rate for services rendered. This is accomplished using the rate stabilization program. Based on the AFMB a guaranteed manday or direct labor hour rate is calculated to obtain a no gain/ no loss accumulated operating result for each production shop, hence the shipyard as a whole. It must be emphasized however, that the rate stabilization concept does not change the methods of developing overhead rates nor the method of charging labor, direct material or overhead to a customer job order as discussed earlier, just the base for billing the customer. Because the rate stabilization concept requires establishment of rates that recover total operating costs, shipyards have developed and established various rates to reflect the diversity in anticipated types of work to be accomplished. The approved stabilized rate remains in effect from start through completion of the project and includes direct labor and associated

acceleration, direct material, production overhead, general and administrative overhead and projected inflation per guidance issued by the Office of the Secretary of Defense. The differences between actual costs incurred and the use of stabilized rates for a predetermined rate reimbursable order are reflected in a Rate Stabilization Variance Account. (NIF Manual, October 1981)

The fixed price reimbursable order involves an agreement between the shipyard and its customer for specific work at a specific fixed price. Fixed price orders are negotiated using the established stabilized rates and are made without regard to recouping stabilized gains or paying back stabilized losses that exist in the Rate Stabilization Variance Account. To isolate fixed price variances from stabilized rate variances in fixed price orders all differences between stabilized costs and actual costs and between fixed prices and stabilized costs are closed out to a Fixed Price Variance Account. (NIF Manual, October 1981)

IV. FINANCIAL INFORMATION FLOWS

The purpose of this chapter is to explain the external and internal information flows characteristic of the Puget Sound Naval Shipyard. External information flows include the accumulation of specific weapon system costs which are reported to the Office of the Assistant Secretary of Defense (MI&L) and budget and execution reporting to COMNAVSEASYSCOM, the Activity Group Commander. Internal information flows include that information used by shipyard management for performance analysis and evaluation.

A. INFORMATION FLOWS FROM PSNS TO OASD

Once a job order has been completed and all associated production costs have reconciled, the job order is closed out to the project's Customer Order Record (COAR). This process continues, accumulating job order costs under the appropriate COAR, until all job orders issued to support the respective COAR have been completed. At this time, the Planning Department notifies the Comptroller Department of COAR completion. The Comptroller Department conducts a final review to verify that all labor, material and overhead costs have been applied. Once a COAR is recognized as closed to any further billing, the COAR and all supporting cost data is translated to a Cost Master File which is maintained as a distinct computer based data file until the quarterly reporting date. Quarterly, cost data for all COARs final billed during the previous period is compiled on a computer tape and forwarded to the Naval Sea Systems Command Automated Data Systems Activity (SEAADSA, Indian Head, MD) as PSNS's "Depot Maintenance Quarterly Tape

Report" (Report Symbcl FA 4651). (Clavering, March 1985) At SEAADSA, the Depot Maintenance Quarterly Tape Report is checked for formatting errors and merged with the Quarterly Tape Reports from the seven other naval shipyards which comprise the Shipyard Activity Group. The merged Depot Maintenance Quarterly Tape Report for all eight shipyards is redesignated Report Symbol FA 4671 and forwarded to the Navy Accounting and Finance Center (NAFC Code 64), located in Washington D.C. (Poupore, March 1985). The NAFC edits and processes the computer tape to identify and correct any errors that may exist. This specific NAFC maintains the Depot Maintenance Cost Information System for all Depot Maintenance activities within the Department of the Navy (DON). At the beginning of each new fiscal year, the NAFC forwards to OASD (MI&L) the aggregate of all cost data provided by all eight naval shipyards for the previcus year as a report titled "Depot Maintenance and Maintenance Support Costs." (Brouillard, March 1985)

SEAALSA is the central design agency for the computer program used by the individual shipyards to format the cost information provided on the Cost Master File into that format required by DcD Instruction 7220.29-H, the Department Cf Defense Depot Maintenance and Maintenance Support Cost Accounting and Prcduction Reporting Handbook (Depot Maintenance Handbook). The computer program, titled "Depot Maintenance Master", provided by SEAADSA applies header information and formats the respective information. The cutput from each shipyard takes two forms: a hard copy report, "Depot Maintenance Quarterly Tape Report" (Report Symbol FA 465A) and the computer tape edition described above (Report Symbol FA 4651) (Poupore, March 1985).

B. INFORMATION FLOWS FROM PSNS TO COMNAVSEASYSCOM

As Activity Group Commander, COMNAVSEASYSCOM is responsible for the operation of all naval shipyards. To support this requirement, a series of periodic budget and execution reports have been formulated to provide financial data to support a management perspective about specific shipyard financial operations. This reporting structure, which uses monthly, quarterly, and annnual reporting requirements is COMNAVSEASYSCOM's primary method for monitoring not only day to day operations of any particular shipyard but the system of shipyards as a whole. This system of periodic reports is referred to as the Navy Industrial Fund Reporting Systems (NIFRS). (NIF Manual, October 1981)

1. The Navy Industrial Fund Reporting System (NIFRS)

The Navy Comptroller General (NAVCOMPT) maintains a computer based data management system used by all Naval Industrial Fund (NIF) activities. This system, the Automated Digital System or AUTODIN is used by Activity Group Commanders such as COMNAVSEASYSCOM and the individual shipyard activity elements for two way data transmission. The data transmission consists of a series of standardized budget and execution reports that comprise the Navy Industrial Fund Reporting System or NIFRS. NIFRS consists of two distinct reporting sub-systems: budget and execution. To support the budgetary sub-system, PSNS submits an Annual Financial Management Budget (AFMB) as part of the Annual Financial Management Budget Reporting System. To support the execution sub-system, a series of periodic financial and operating statements are used. (NIF Manual, October 1981)

a. Budget Reporting Sub-system

The Annual Financial Management Budget (AFME) is the starting point for naval shipyard input to the Presidents Annual or A-11 budget. It provides detailed information on the estimated prior year financial condition of the activity as well as an operating budget for the current year. Furthermore, it provides budgetary information on the budget year, the first year after the current operating year, which is used in the formulation of stabilized rates. (NIF Manual, October 1981)

COMNAVSEASYSCOM, as Activity Group Commander, acts as sponsor for each shipyard budget input. As such, COMNAVSEASYSCOM provides guidance for budget preparation to include: 1) pay raises 2) material price escalations and 3) execution. As an additional responsibility, COMNAVSEASYSCOM reviews the various annual shipyard A-11 budget inputs and submits an aggregated activity group A-11 budget to NAVCOMPT.

The responsibility for the preparation of the A-11 budget by Puget Sound Naval Shipyard is shared by all levels of management. From the shipyard Commander who establishes policy and guidance for budget formulation to Production shop managers who formulate all budget requirements for labor, material, and overhead. Specific shipyard input includes all historical, current and budget information for the three years being discussed to support requirements outlined in the NIF Manual. The requirements include:

Summary of Operations

Workload by Categories-Summary

Workload by Categories-Detailed

Department Staffing

Significant Program Costs

Analysis of Costs Incurred

Object Classification

Stabilized Manday Cost Worksheet

Manday Rate Components

Direct Material Rates-by class of ship

Direct Material Rates-by specific hull

Analysis of Accumulated Operating Results

Payback Calculation Data

Fast Payback Investments

POI

Consumption and Costs

Cash and AOR Impact Schedule

Acceleration Rate Analysis

Depot Level Repairable Analysis

Travel

The NIF Manual, Chapter 5-Section 5 "AFMB PREPARATION" is the reference source for definitions and format of the reporting requirements. Appendix A to Chapter 5 is a collection of standarized worksheets used as guidance to support the annual budget input. (NIF Manual, October 1981)

b. Execution Reporting Sub-system

As stated earlier, COMNAVSEASYSCOM requires a series of monthly, quarterly and annual budget execution

reports that are independent of the budget reporting subsystem. These budget execution reports take the form of periodic financial and operating statements.

Monthly, each shipyard is required to prepare and submit a basic report of financial data that addresses:

Average Daily Wage Rates

Cost and Budget Summary Data for Work-in-Process (WIP)

Actual/Applied Expense Data

The NIF Manual, Chapter 7 "Financial Statements" includes examples of the report titled "Financial Data-Monthly" (Report No. NAVSEA 7600-1A). This report contains examples and definitions to support monthly reporting requirements.

The Quarterly Financial and Operating Statements are management oriented and include the following required information:

Statement of Financial Condition

Analysis of Capital Fund

Statement of Revenue and Costs

Analysis of Accumulated Operating Results

Analysis of Major Nonrecurring Maintenance

Summary Sources of Revenue

Analysis and Projection of Cash

Analysis of Accrued Expenses

NIF Capital Investment Program

Significant Program Costs Summary

Cost and Budget Summary for Work-in-Process

Summary of Maintenance Costs

Summary of Operating Expense

Summary of Labor Hours

Summary of General Expense Distribution

Shipwork in Progress

Shop Stores Performance Report

Material Management Performance by Hull

Additionally, each Quarterly Financial and Operating Statement contains an Executive Summary. The Executive Summary consists of two segments; a narrative portion and a graphic overview of operations. The narrative portion includes a discussion of:

State of Activity

Significant Accomplishments

Significant Budget Variances

Accumulated Operating Results

Over/Under Applied Expenses

Fixed Price/Cost Reimbursable Variances

Unfunded Commanders Orders in Unbillable WIP

Adjustments to Accumulated Operating Results

Fast Payback Items

Labor

Employment Level

Overtime Rate

Productive Ratio

Wage Rate

Balance Sheet

Aging of Accounts Receivable

Backlog of Maintenance and Repair

Material

Shop Stores

Direct Material Inventory

Material in Transit

Inventory Adjustments

The graphic overview provides management with an amplified picture of financial operation to supplement the financial summary. These charts provide a graphic presentation of:

Accumulated Operating Results

Composite Overhead Rates

Shop Stores Inventory

Direct Material Inventory

Revenue Recognition

The Annual Financial and Operating Statement contains an aggregate of data based on the fiscal year to date and the quarter just completed. Primary emphasis is given to recapping the fiscal year and comparing the actual operation of the shipyard with budget. The Annual Financial and Operating Statement is comprised of the Executive Summary and those reports required for quarterly reporting with specific annual reports to include:

Operating Cost Summary Gas Plant

Operating Cost Summary Foundry

Operating Cost Summary Galvanizing

Operating Cost Summary Steel Preservation

Operating Cost Summary Laminated Placards

Common Services Cost Center Summary

Production Cost Center Operating Statements

Detailed Overhead Expense Statement

Utilities Cost Analysis Report

The monthly, quarterly and annual reporting requirements for the shipyard activity group are outlined specifically with examples and narrative in Chapter 7, "Financial Statements" of NAVSEAINST 7600.27, the NIF Manual.

C. PSNS INTERNAL INFORMATION SYSTEM

In addition to specific weapon system costs reported to CASD and the budget and execution report structure between

PSNS and COMNAVSEASYSCOM, the shipyard has developed an internal set of key indiciators for performance analysis. This system of key indicators consists of both measures of performace for PSNS as compared to other Naval shipyards and performance within the shipyard. (Sherman, February 1985)

For external comparison, PSNS has taken advantage of the AUTODIN reporting system and developed a collection of performance data based on the reports submitted to support NIFRS by the other Naval shipyards. This data base is used by the PSNS Comptroller as a baseline by which the performance of PSNS can be compared to itself (trends) and to the performance of other Naval shipyards. Specific information and reports extracted include:

Direct Labor Mandays Worked

Manday Rate Percentage Increase

Costs per Direct Labor Manday

Labor and Overhead Costs per Manday Normalized for Wage Differential

Changes in Indirect Labor Ratio

Direct Non-Labor Costs per Manday

This information permits the analysis of direct labor, direct material and overhead costs for each individual shipyard. (Sherman, February 1985)

For internal comparison, PSNS has developed a historical data base for performance analysis. By the use of a few key indicators the shipyard Comptroller monitors present performance and trends.

The performance categories measured by these indicators include:

Budgeting

Overhead

Direct Labor Efficiency

The budgeting analysis is not designed as a measure of efficiency but to monitor actual and budgeted performance. Here the shipyard Comptroller compares actual performance data for each organizational element with that provided in the AFMB. Variances between actual and budget are used to increase the estimating accuracy of future budget inputs.

The overhead analysis includes the following application ratios:

$$\text{Indirect Labor Ratio} = \frac{\text{Total Indirect Hours} \times 1000}{\text{Total Direct Hours}}$$

$$\text{Indirect Staff Ratio} = \frac{\text{Total Indirect Straight Time} \times 1000}{\text{Total Direct Straight Time}}$$

$$\text{Productive Ratio} = \frac{\text{Direct Straight Time Worked} \times 100}{\text{Total Straight Time Worked}}$$

$$\text{Indirect Material Ratio} = \frac{\text{Indirect Material Costs}}{\text{Total Direct Mandays}}$$

These ratios may or may not measure the efficiency of use of overhead resources. They are primarily designed to measure and reveal trends relating indirect time and costs to direct time and costs. For example, the Indirect Labor Ratio and the Indirect Staff Ratio are designed to compare indirect

hours to direct hours. This comparison reveals changes in the indirect labor burden supported by direct or production hours. Manday costs are those costs for labor, material and overhead charged for a standard 8 hour work day performed in a production shop. A manday rate is calculated for each production shop and is based on an average of all these costs that are expected to be incurred by a worker of the particular production shop. The manday rates are reflected in the AFMB and become a standard upon approval by COMNAVSEASYSCOM, the Activity Group Commander. Normalized costs are those costs that have been adjusted for wage differences that exist between different Naval shipyards.

The Direct labor Efficiency ratios include:

Performance Factor=Actual Mandays on Closed Job Orders/
Estimated Mandays on Closed Job Orders

Performance by Class of ship-Comparison of performance on ships of same class or similiar work.

These ratios are a measure of efficiency. They are used to compare the actual costs of a particular maintenance action with what the maintenance action should have cost based on an application of standards. The ratios also reveal changes in performance (trends) in mandays used based on comparisons with other shipyards. (Sherman, February 1985)

V. OASD REPORTING ANALYSIS

A. INTRODUCTION

The purpose of this research project is to examine the cost acccunting and reporting structure used by the Navy in its shipyards. The investigation focuses on developing an understanding of the degree to which the data collected and reported by this system fulfills the requirements of the Department of Defense (DoD) uniform cost accounting system as set forth in the Department of Defense Depot Maintenance and Maintenance Support Cost and Production Reporting Handbook (The Depot Maintenance Handbook-DoD Instruction 7220.29-H).

To satisfy this requirement, this thesis provides the reader with the infcrmation necessary to understand the depot maintenance repcrting system. Chapter One introduces the histcrical significance and importance of a uniform cost accounting system designed tc collect depot maintenance costs associated with a specific weapon system or suppcrt item. Chapter Two provides insight into the performance of depot maintenance in the system of Naval shipyards with specific emphasis on Puget Sound Naval Shipyard. Chapter Three discusses the production and cost accumulation prccess characteristic of Puget Sound Naval Shipyard. The chapter also discusses how costs are accumulated in a specific job order system for labcr, material and overhead. Chapter Four discusses the uses made of the cost information and the various reporting structures that parallel those established in the Depot Maintenance Handbook.

Chapter Five builds on that information provided in Chapters 1-4 to specifically analyze the requirements cf the

Depot Maintenance Handbook and how these requirements are supported by the cost accumulation system used by the example, Puget Sound Naval Shipyard. To accomplish this, Chapter Five integrates information already provided with the specific requirements of the various organizations involved.

B. REQUIREMENTS OF THE DEPOT MAINTENANCE HANDBOOK

As discussed in Chapter One, the principal objective of the Depot Maintenance Handbook is to establish a uniform cost accounting system for use in accumulating the costs of depot maintenance activities. Information accumulated to support this objective is designed to assist in the measurement of productivity, development of performance and cost standards, and to identify maintenance capability.

To support this cost accumulation requirement, the Depot Maintenance Handbook provides principles and procedures to ensure uniform accumulation and reporting in the Depot Maintenance Reporting System. This guidance takes the form of a set of requirements that apply the Cost Accounting Standards Board principles to DoD depot maintenance activities. This guidance includes rules to support:

Consistency in estimating, accumulating and reporting costs.

Consistency in allocating costs.

Allocation of command expenses.

Capitalization of tangible assets.

Accounting for unfunded costs.

Cost accounting periods.

Use of standard costs for direct material and direct labor.

Accounting for costs of compensated personnel absences.

Depreciation of tangible capital assets.

Accounting for acquisition cost of materials.

To support the Depot Maintenance Reporting System the Depot Maintenance Handbook identifies 42 distinct information fields that make up the reporting requirement for shipyard depot maintenance. These information or data fields take form as the Depot Maintenance Quarterly Tape Report (Report symbol FA 4651) discussed in Chapter Four. Reporting includes Record Identification Information (fields 1-8), Identification of Item/Service and Customer (fields 9-16), Labor Hours and Costs (fields 17-44) and Production Data (fields 45-50). Of the 51 data fields addressed above, two data fields are designed to support future growth and are not presently being used. Also, seven data fields are not applicable to shipyard maintenance based on guidance provided in the Depot Maintenance Handbook. The specific data fields that address shipyard maintenance as outlined in the Depot Maintenance Handbook include:

Field No.	Description of Data
	Record Identification Information---
01	Record Type F
02	Quarter Code
03	Fiscal Year/Identification of Facility
04	Program Element
05	Facility Name or Code

06 Inside or Outside U.S. Code

07 Owner/Operator Code

08 Reporting Facility Code

Identification of Item/Service and Customer---

09 Item Identification Number

10 Item Nomenclature

11 Standard Inventory Price

12 Weapon Performance Code

13 Work Breakdown Structure Code

14 Work Performance Category

15 Customer Used

16 Unused

Labor Hour and Cost Data---

17 Direct Civilian Labor (Production) Cost

18 Direct Civilian Labor (Production) Hours

19 Direct Civilian Labor (Other) Costs

20 Direct Civilian Labor (Other) Hours

21 Direct Military Labor (Production) Cost

22 Direct Military Labor (Production) Hours

23 Direct Military Labor (Other) Cost

24 Direct Military Labor (Other) Hours

25 Direct Material Costs-Funded

26	Direct Material Cost-Unfunded (Investment Items)
27	Direct Material Cost-Unfunded (Exchanges)
28	Direct Material Cost-Unfunded (Modification Kits)
29	Direct Material Cost-Unfunded (Expense)
30	Other Direct Cost-Funded
31	Other Direct Cost-Unfunded
32	Operations Overhead-Funded
33	Operations Overhead-Unfunded
34	General and Administrative Expense-Funded
35	General and Administrative Expense-Unfunded
Fields 36-42	Not Applicable to shipyard reporting
36	Contract/Interservice/Non-Depot Maintenance Activity Cost
37	Government Furnished Material (Investment Item)
38	Government Furnished Material (Exchanges)

39 Government Furnished Material (Modification Kits)

40 Government Furnished Material (Expense)

41 Government Furnished Material-Funded

42 Government Furnished Material-Unfunded

43 Maintenance Support Costs-Organic (Funded)

44 Maintenance Support Costs-Organic (Unfunded)

Production Data---

45 Total Production Quanity-Completed

46 Unused

47 Quanity of Completed Items Inducted during Reporting Year

48 Quanity of Completed Items Inducted during Preceding Reporing Year

49 Quanity of Completed Items Inducted during all other Previous Years

50 Work Days in Process

The Depot Maintenace Handbook also provides definitions for all 42 fields that apply to shipyard depot mainterance. The Record Identification Information and Identification of

Item/Service and Customer are of importance to the cost accumulation and reporting system only as header or identification information. Labor Hours and Cost Data and Production Data are key information fields for cost accumulation data. These fields are defined in the Depot Maintenance Handbook as:

Labor Hour and Cost Data--

Direct Civilian Labor (Production) Costs-

Those civilian labor costs directly associated with the maintenance process. The costs are based on current payrate plus acceleration.

Direct Civilian labor (Production) Hours-

Those civilian labor hours directly associated with the maintenance process.

Direct Civilian Labor (Other) Cost-

Those civilian labor costs that would not be required except for the existance of a specific job order requirement, even though such a requirement does not accomplish any of the required maintenance, e.g., shop survey. The cost is based on current payrates plus acceleration.

Direct Civilian Labor (Other) Hours-

Those civilian labor hours that would not be required except for the existance of a specific job order, even though such a requirement does not accomplish any of the required maintenance, e.g., shop survey.

Direct Military Labor (Production) Cost-

Those military labor costs directly associated with the maintenance process. Military labor costs are based on standard application rates provided in the NAVCOMPT Manual.

Direct Military Labor (Production) Hours-

Those military labor hours directly associated with the maintenance process.

Direct Military Labor (Other) Costs-

Those military labor costs that would not be performed except for the existance of a specific job order requirement, but does not accomplish any of the required maintenance, e.g., shop survey.

Direct Military Labor (Other) Hours-

Those military labor hours that would not be performed except for the existance of a specific job order requirement, but does not accomplish any of the required maintenance, e.g., shop survey.

Direct Material Cost-Funded-

These material costs directly associated with the maintenance process. Charges to job orders and credits for returns will be based on current standard catalog or acquisition costs.

Direct Material Cost-Unfunded (Investment Items)-

These material costs for Investment Items furnished by customers are to be included in the depot maintenance work as directed by the customer.

Direct Material Cost-Unfunded (Exchanges)-

Those material costs for repairable exchanges. These costs are based on an average cost to repair the exchangeable.

Direct Material Costs-Unfunded (Modification Kits)-

Those material costs for modification kits. These costs are to be included in the the depot maintenance work as directed by the customer.

Other Direct Costs-Unfunded-

Those unfunded direct costs not directly associated with any other labor or material cost category.

Operations Overhead-Funded-

Those funded indirect costs incurred by the cost centers plus the allocated share of indirect department or service center costs.

Operations Overhead-Unfunded-

Those unfunded indirect costs incurred by the cost centers plus the allocated share of indirect department or service center costs.

General and Administrative Expenses-Funded-

Those indirect costs or expenses of a general and administrative nature incurred by the organization as a whole, not by specific cost centers. This data field addresses only funded costs.

General and Administrative Expenses-Unfunded-

Thcse indirect costs or expenses of a general and administrative nature incurred by the organization as a whole, not by specific production cost centers. This section addresses only unfunded costs.

Maintenance Support Costs Organic-Funded-

Not defined in the Depot Maintenance Handbook.

Maintenance Support Costs Organic-Unfunded-

Not defined in the Depot Maintenance Handbook.

Production Data--

Total Production Completed-

The total production quantity completed during the reporting period.

Quantity of Completed Items Inducted during Reporting Year-

The total production quantity started and completed during the fiscal year.

Quantity of Completed Items Inducted during Year Preceding Reporting Year-

The total production quantity started during the previous fiscal year but completed during the current fiscal year.

Quantity of Completed Items Inducted During All Other Previous Years-

The total production quantity not already reported but completed during the current fiscal year.

Work Days in Process-

The number of days the system or item was included as work-in-process.

These definitions are located in the Depot Maintenance Handbook: section 320 for labor, section 330 for material, section 340 for other direct costs and section 350 for indirect costs. Funded costs are those costs incurred and paid for by the depot maintenance activity in support of a maintenance action. Unfunded costs are those costs incurred by the depot maintenance activity in support of a maintenance action but directly paid for by an outside activity, i.e., the customer or another federal agency. (Depot Maintenance Handbook, October 1975)

C. REQUIREMENTS OF THE MIS USERS MANUAL

As discussed in Chapter Four, SEAADSA acts as an agent for OASD (MI&L) to produce the Cost Master computer program used by each Naval shipyard to reformat cost information contained in the shipyards' Cost Master File to support the Depot Maintenance Reporting System. The Cost Master computer program provided by SEAADSA adds appropriate header information and reformats the Cost Master File to produce each respective shipyards' Depot Maintenance Quarterly Tape Report (Report symbol FA 4651). Although this information is to satisfy reporting requirements outlined in the Depot Maintenance Handbook, SEAADSA uses format and information requirements provided in the Naval Shipyard MIS Users Manual (NAVSEA-0900-68-6020) to produce the Cost Master computer program rather than the Depot Maintenance Handbook. Some of the information required of each Naval shipyard to support the format outlined in the MIS Users Manual as the Quarterly

Tape Report, is different from that required by the Depot Maintenance Handbook. Specifically, information required to support Record Identification Information (fields 1-8), Identification of Item/Service and Customer (fields 9-16), and Production data (fields 45-50) are consistent with that required by the Depot Maintenance Handbook. However, the Labor Hour and Cost Data (fields 17-44) required by the MIS Users Manual, via the Cost Master computer program, is different from the requirements contained in the Depot Maintenance Handbook. The differences that exist between the Depot Maintenance Handbook and the MIS Users Manual are discussed in the next section.

D. REPORTING DESCREPANCIES

The reporting differences that exist between the information required by the Depot Maintenance Handbook and information which is actually reported in accordance with requirements outlined in the MIS Users Manual consists of two types: the number of Depot Maintenance Handbook data fields being addressed in the MIS Users Manual and the definitions to support data fields being reported.

The MIS Users Manual requires reporting 15 of the 21 data fields contained in the Labor Hour and Cost Data section of the Depot Maintenance Handbook that are appropriate for shipyard reporting. These 15 data fields as defined in the MIS Users Manual include:

Labor Hours and Cost Data--

Direct Civilian Labor (Production) Cost-

The straight time, overtime, and holiday labor costs for Production Shops.

Direct Civilian Labor (Production) Hours-

The straight time, overtime, and holiday labor hours for Prcduction shops.

Direct Civilian Labor (Other) Cost-

The straight time, overtime, and holiday labor costs for Non-Production Shcps.

Direct Civilian Labor (Other) Hours-

The straight time, overtime, and holiday labor hours for Non-Production Shcps

Direct Masterial Cost-Funded-

The Material and Shop Stores costs for all production shcps.

Direct Material Cost-Unfunded (Investments Items)-

Government furnished material costs for all but alteration work.

Direct Material Cost-Unfunded (Exchanges)-

Average cost cf government furnished material.

Direct Material Costs-Unfunded (Modification Kits)-

Government furnished material costs for alteration work.

Other Direct Cost-Funded-

The other costs for production shops.

Operations Overhead-

Direct reimbursements and overhead costs less the G&A rate for all production shops.

Cperations Overhead-Unfunded-

Depreciation costs for Production shops and military costs for all production shops.

General and Administrative Expense-Funded-

The G&A portion of the overhead.

General and Administrative Expense-Unfunded-

Depreciation costs for non-production shops and headquarters costs.

Maintenance Support Costs Organic-Funded-

Labor, material, shop stores, other direct reimbursement and overhead costs for all shops on Work Performance Categories P-S.

Maintenance Support Costs Organic-Unfunded-

GFM, military, depreciation, headquarters costs, and fiscal year end over or under absorbed overhead for Work Performance Categories P-S.

The data fields that are not addressed as a reporting requirement by the MIS Users Manual include:

Direct Military Labor (Production) Cost

Direct Military Labor (Production) Hours

Direct Military Labor (Other) Cost

Direct Military Labor (Other) Hours

Direct Material Cost-Unfunded (Expense)

Other Direct Costs-Unfunded

Specific reasons why these data fields are not addressed in the MIS Users Manual follow. All six data fields address unfunded costs.

CCMNAVSEASYSCOM, the Shipyard Activity Group Commander, through budget and execution guidance provided in the NIF Manual (page 5-2-3) states, "Currently, no direct military labor hours are expended at shipyards". This guidance, that no direct military labor hours are expended at shipyards is reflected in the MIS Users Manual, also COMNAVSEASYSCOM guidance, by excluding the reporting of military costs. Hence, Puget Sound Naval Shipyard does not collect military labor hours or associated cost data to support the Depot Maintenace Handbook's requirements for:

Direct Military Labor (Production) Costs

Direct Military Labor (Production) Hours

Direct Military Labor (Other) Costs

Direct Military Labor (Other) Hours

Presently, PSNS employs 259 military personnel. Because many of the military personnel fill several positions (i.e. administrative, productive and support) it is not possible to categorize all military labor costs associated with shipyard maintenance. However, military costs are not considered material in a work force of almost 13,000 workers. Military personnel represent approximately 2% of the total workforce. (Anderson, May 1985)

Additionally, information to support the data fields:

Direct Material Cost-Unfunded (Expense)

Other Direct Costs-Unfunded

is not collected or reported by Puget Sound Naval Shipyard because the information is not required by the MIS Users Manual. Costs information to support the data fields Direct Material Cost-Unfunded (Expense) and Other Direct Costs-Unfunded as defined in the Depot Maintenance Handbook are not considered material by shipyard personnel. (Anderson, May 1985)

For some of the data fields required by both the Depot Maintenance Handbook the MIS Users Manual there exists definitional differences between the two reporting requirements. The data fields in question include:

Operations Overhead-Unfunded

General and Administrative Expenses-Unfunded

Maintenance Support Costs Organic-Funded

Maintenance Support Costs Organic-Unfunded

The definition for Operations Overhead-Unfunded as outlined in the MIS Users Manual includes depreciation costs for production shops and military costs. However, depreciation costs for production shops are included in the overhead rate that is charged to the customer. As such, this overhead cost becomes funded since it is being paid for by the customer. Being funded by the customer, the overhead costs for depreciation should become an element of Operations Overhead-Funded data field as defined in the Depot Maintenance Handbook. Additionally, as discussed above, military labor costs are not accumulated by Puget Sound Naval Shipyard. Because they are not accumulated, they are not reflected as a overhead expense in the Operations Overhead-Unfunded data field.

The General and Administrative Expense-Unfunded data field as defined in the MIS Users Manual also includes depreciation costs for non-production shops. Similiar to the production shop overhead rate calculation, depreciation costs are included in the General and Administrative overhead rate paid for by the customer. Being a reimbursable cost, this cost should be reflected in the General and Administrative Expense-funded data field as defined in the Depot Maintenance Handbook.

An additional definitional reporting descrepancy is that the Depot Maintenance Handbook does not define the data fields Maintenance Support Costs-Funded and Maintenance Support Costs- Unfunded.

The Cost Master File used by Puget Sound Naval Shipyard was specifically created to satisfy depot maintenance reporting requirements outlined in the MIS Users Manual. The cost accumulation system used to support the Cost Master file was designed to report costs incurred and paid for by the shipyard. Because unfunded requirements are not paid for by the shipyard, they must be addressed in a manner different than that used to support funded shipyard requirements. To support the identification and accumulation of costs in a manner that will support the Costs Master File and the MIS Users Manual, a separate job order within a COAR must be used to identify the unfunded costs (Kersten, April 1985). This is done for the data fields:

Direct Material Costs-Unfunded (Investment Items)

Direct Material Costs-Unfunded (Exchanges)

Direct Material Costs-Unfunded (Modification Kits)

The establishment of a separate job order is possible for the other data fields that reflect unfunded costs such as:

Other Direct Costs-Unfunded

General and Administrative Expenses-Unfunded

However, the information to support these data fields is not comprised of distinct information items that permit easy identification and separation from larger cost pools or the information is just not collected. The cost accumulation system used by Puget Sound Naval Shipyard would have to be modified to track these additional costs. This would entail developing a system to be used by shipyard personnel to identify and track those costs that would satisfy Depot Maintenance Handbook definitions for Other Direct Costs and General and Administrative Expenses. With such a system in place, shipyard personnel could pursue information to satisfy these information fields for greater reporting accuracy in support of the Depot Maintenance Reporting System. The key to such a system would be the identification of those costs that would typically satisfy definitional requirements and the pursuit of these costs for assignment to the respective COAR.

VI. CONCLUSIONS AND RECOMMENDATIONS

This Chapter summarizes the findings of the study and offers recommendations for system improvement and areas for further study.

A. CONCLUSIONS

1. The information submitted to support the Depot Maintenance Handbook has great value as a management tool. However, shipyard management personnel said that they receive minimal feedback. Additionally, what feedback that is received has little value because managers do not understand how inputted data are manipulated in the output reporting system. (Sherman, January 1985)

2. There exists differences between cost cost information accumulated by PSNS as required by CCMNAVSEASYSCOM, and cost information required by OASD. These differences include:

   A) CCMNAVSEASYSCOM does not to require PSNS to accumulate all data necessary to support the reporting requirements of the Depot Maintenance Handbook.

   B) Differences between cost definitions used by CCMNAVSEASYSCOM (MIS Users Manual) and OASD (Depot Maintenance Handbook).

Specific cost information not collected or reported by PSNS to OASD to support the Depot Maintenance Handbook requirements include data to support the following data fields:

Direct Military Labor (Production) Costs

Direct Military Labor (Production) Hours

Direct Military Labor (Other) Costs

Direct Military Labor (Other) Hours

Direct Material Cost-Unfunded Expense

Other Direct Cost-Unfunded

As discussed in Chapter 5, the depot maintenance data requirements not supported by PSNS's cost accumulation system are immaterial. Direct military labor costs are less than 2% of the total labor effort expended at the shipyard. Similarily, the costs associated with the data fields Direct Material Costs-Unfunded and Other Direct Costs-Unfunded are considered minimal, hence immaterial. (Anderson, May 1985)

Specific data fields where definitional differences exist include:

Operations Overhead-Unfunded

General and Administrative Expenses-Unfunded

The definition for Operations Overhead-Unfunded and General and Administrative Expenses-Unfunded include depreciation and indirect military labor costs as defined in guidance provided PSNS by CCMNAVSEASYSCOM through the MIS Uses

Manual. These definitions contain two inherent reporting descrepancies:

a) PSNS does nct accumulate military labor costs per guidance provided in the NIF Manual, an additional source of CCMNAVSEASYSCOM guidance.

b) PSNS includes depreciation as a funded cost. Although COMNAVSEASYSCOM requires that depreciation be reflected as an unfunded cost, PSNS accumulates depreciation through stabilized rates as a funded cost. Addressing depreciation as a funded cost satisfies Depot Maintenance Handbook requirements as discussed in Chapter 3.

3. A key objective of the Depot Maintenance Reporting System is to assist in measuring productivity, developing perfcrmance and cost standards and determining areas for management emphasis (DoD Instruction 7220.29-H, October 1975). This objective if achieved would enable shipyard managers to evaluate depot maintenance activities for efficient resource use (GAO Report, May 1978). Unfortunately, data submitted by PSNS to support the Depot Maintenance Reporting System are not reflective of current shipyard operations. The source of information used as a base to support the Depot Maintenance Handbook is the Cost Master File, created expressly for this purpose. Ccst infcrmation is not submitted by shipyard personnel to be included as part of the Cost Master File until a COAR is completed and final billed, therefore timliness is an issue. The life of a COAR may be as long as three years or as short as several days. Because

information is submitted to the Cost Master File at time of final billing, cost and performance data are reflective of past as well as present operations. This mixing of historical and current information precludes the use of trend analysis or development of specific labor, material or overhead rates that are reflective of any particular operating period.

B. RECOMMENDATIONS

1. The materiality of those data fields that are either not reported or in which definitional differences exist must be recognized. A field study to substantiate the perception by shipyard personnel that these costs are immaterial should be conducted. If these data fields contribute little of substance to management goals and expectations for the Depot Maintenance Reporting System they must be deleted as a shipyard requirement to prevent confusion.

2. A manageable system to input COAR cost data to the Depot Maintenance Reporting System for work-in-process should be developed. This change would enhance shipyard management use of the Depot Maintenance Reporting System as a timely management tool.

3. A formalized feedback system needs to be developed and promulgated to enhance shipyard management use of the Depot Maintenance Reporting System.

4. Data field definitions as outlined in Chapter 3 of the Depot Maintenance Handbook are disjointed and difficult to use. Rather than having the data fields

discussed in text, they should be addressed as concise and explicit definitions with references to text for further explanation.

5. Definitions for the the data fields Maintenance Support Costs Organic-Funded and Maintenance Support Costs Organic-Unfunded are not defined in the Depot Maintenance Handbook. The definitions for these data fields must be included.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

Reccmmendations for further research include field studies to:

1. Validate the perception by shipyard personnel that those data fields that are not reported or in which definitional differences exist are immaterial.

2. Determine how best to incorporate the findings and recommendaticns of this thesis.

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